

material which includes NiFe alloys, FeSiAl alloys, amorphous CoZrNb alloys, etc. On the lower magnetic shield layer 22, formed is a spin valve GMR film 24 via a lower reproduction magnetic gap 23 of a nonmagnetic insulating material such as  $\text{Al}_2\text{O}_3$  or the like. As the spin valve GMR film 24, used is the spin valve film 8 of any of the embodiments mentioned hereinabove.

In Fig. 44, the spin valve GMR film 24 is so etched that its profile could have a desired track width. The etching is to remove the outer region of the film 24 that oversteps the recording track width. At the both outer edges of the spin valve GMR film 24, disposed are films 25 which are to apply a bias magnetic field to the film 24. The pair of bias magnetic field applying films 25 are in abutted junction to the edges of the spin valve GMR film 24.

On the pair of bias magnetic field applying films 25, formed are a pair of electrodes 26 of Cu, Au, Zr, Ta or the like. To the spin valve GMR film 24, supplied is sense current from the pair of electrodes 26. These spin valve GMR film 24, paired bias magnetic field applying films 25 and paired electrodes 26 constitute a GMR reproduction device part 27. As mentioned above, the GMR reproduction device part 27 has a so-called abutted junction structure.

In Fig. 45, the pair of bias magnetic field applying films 25 which are to apply a bias magnetic field to the spin

valve GMR film 24 are previously formed between the spin valve GMR film 24 and the lower reproduction magnetic gap 23 in the region not for the track width. The pair of bias magnetic field applying films 25 are separated by a predetermined space therebetween, and the layers of the part outside the reproduction track for the spin valve GMR film 24 are laminated thereover. On the spin valve GMR film 24, the bias magnetic field applying films 25 may be laminated only at its both edges, if desired.

On the spin valve GMR film 24, formed are the pair of electrodes 26. The substantial reproduction track width of the spin valve GMR film 24 is defined by the distance between the pair of electrodes 26. These spin valve GMR film 24, paired bias magnetic field applying films and paired electrodes 26 constitute the GMR reproduction device part 27 having an overlaid structure.

In Fig. 44 and Fig. 45, an upper reproduction magnetic gap 28 of a nonmagnetic insulating material, which may be the same as that of the lower reproduction magnetic gap 23, is formed on the GMR reproduction device part 27. On the upper reproduction magnetic gap 28, formed is an upper magnetic shield layer 29 of a soft magnetic material which may be the same as that of the magnetic shield layer 22. These constituent elements form a reproducing head, shield-type GMR head 30.

A recording head, thin-film magnetic head 31 is formed on the shield-type GMR head 30. The lower recording magnetic pole of the thin-film magnetic head 31 and the upper magnetic shield layer 29 form one and the same magnetic layer. In other words, the upper magnetic shield layer 29 of the shield-type GMR head 30 acts also as the lower recording magnetic pole of the thin-film magnetic head 31. On the lower recording magnetic pole 29 acting also as the upper magnetic shield layer, formed are a recording magnetic pole gap 32 of a nonmagnetic insulating material such as  $Al_2O_3$  or the like, and an upper recording magnetic pole 33 in that order. Behind the medium-facing site, formed is a recording coil (not shown) which is to apply a recording magnetic field to the lower recording magnetic pole 29 and to the upper recording magnetic pole 33.

The reproducing head, shield-type GMR head 30, and the recording head, thin-film magnetic head 31 constitute the separated recording/reproducing magnetic head. The separated recording/reproducing magnetic head of that type is combined with a head slider, and mounted on a magnetic head assembly, for example, as in Fig. 46. The magnetic head assembly 60 of Fig. 46 is provided with, for example, an actuator arm 61 having a bobbin part for holding a driving coil, and a suspension 62 is connected to one end of the actuator arm 61.

To the tip of the suspension 62, fitted is a head slider